# PRODUCTION AND MARKETING OF CHARCOAL IN ASAL: A CASE STUDY IN KITUI DISTRICT.

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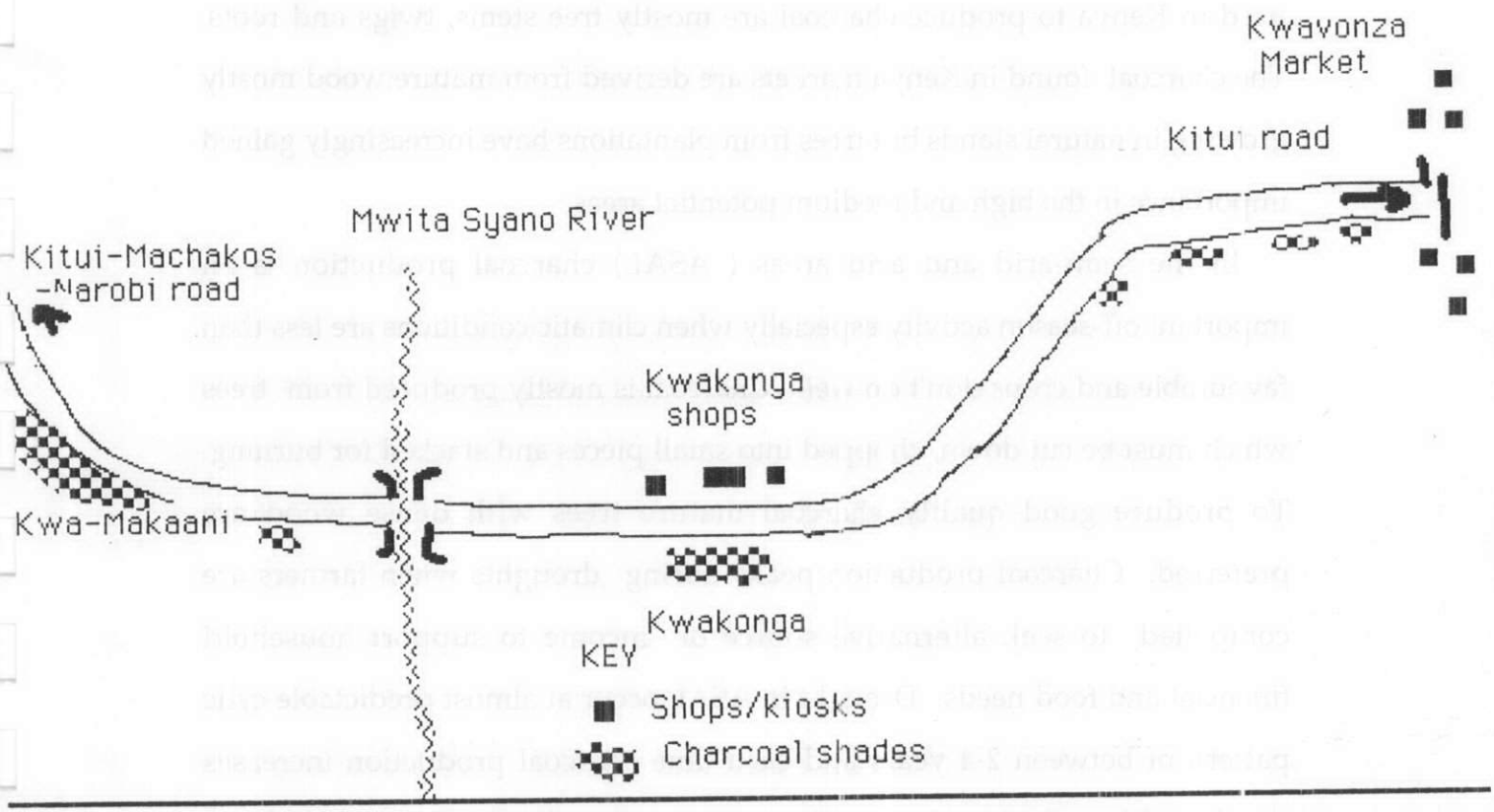

# PRODUCTION AND MARKETING OF CHARCOAL IN ASAL: A CASE STUDY IN KITUI DISTRICT.

## 1.0 Introduction

Charcoal is a product of carbonized plant materials mostly tree parts and agricultural remnants such as coffee husks and nutshells. The materials are burned under limited oxygen to produce charcoal. The materials commonly used in Kenya to produce charcoal are mostly tree stems, twigs and roots. The charcoal found in Kenya markets are derived from mature wood mostly growing in natural stands but trees from plantations have increasingly gained importance in the high and medium potential areas.

In the semi-arid and arid areas ( ASAL) charcoal production is an important off-season activity especially when climatic conditions are less than favourable and crops don't do well. Charcoal is mostly produced from trees which must be cut down, chopped into small pieces and stacked for burning. To produce good quality charcoal mature trees with dense wood are preferred. Charcoal production peaks during droughts when farmers are compelled to seek alternative source of income to support household financial and food needs. Drought in ASAL occur at almost predictable cylic pattern of between 2-4 years and each time charcoal production increases considerably. Such cylic activity negates the efforts of social forestry programmes and need rigorous study to understand its scale and mode of operation and how to cope with its impacts on the environment.

## 2.0 SURVEY OBJECTIVES

The main objective of the survey was to understand the seasonal patterns of charcoal production and marketing in Kwavonza location in Kitui District. It intended to identify producers and sellers of charcoal and how they go about their business and as well identify any pattern in charcoal activities.

## 2.1 SURVEY METHODS

Known charcoal producers were identified using local informers. Though many farmers are unwilling to disclose that they are charcoal producers, those willing were interviewed on various issues in charcoal production business. Dealers along a kilometre stretch between Kwavonza market and Kwa-makaani across River Mwita Syano were interviewed on charcoal business (See Figure 1). The charcoal stocks in each shade and prices between Kwavonza barrier and Kwa-Makaani along Kitui-Machakos road were monitored monthly but in some cases within a period of less than two months between August 1992 and June 1994.

## 3.0 ANALYSIS OF RESULTS

### 3.1 Species for Charcoal Production

Charcoal in Kwavonza is produced from some limited range of naturally growing hard wood species on individual farm lands or communal hills. The preferred species include most acacias such as A. mellifera, A. senegal, A. tortilis and other species such as *Albizia althementica, Balanites aegyptiaca, Neutonia hilderaldii* etc. These species are very slow growing and take many years to mature and their distribution are sparse due to past exploitation or browsing from livestock. The density and composition of the desired species is low but vary from site to site.

### 3.2 Charcoal Producers

It was found that all those interviewed were farmers and charcoal production was a secondary income generating activity. Some of the farmers produced charcoal on certain periods of the year for example 2 to 3 times per year and may not produce for another period of up to 3 or more years depending on agricultural harvests and availability of tree materials in their farms.

Those interviewed have been in business for varied length of time but most range between 5-9 years (Annex A). Their feeling on the supply of materials for producing charcoal was varied. Most of the charcoal is produced in the dry season when agricultural activities are low and alternative sources of income are limited. The wood materials are from their own land and to a lesser extend communal or public lands.

According to the survey, charcoal production in Kwavonza location can be classified as irregular activity. The producers get their material through various sources such as clearing of bushlands for cultivation, utilization of fallen trees and pasture development. Most respondents produce between 5-10 bags per year.

**3.3 Production Technology**

The farmers interviewed use simple and low cost earth kiln technology to produce the charcoal. The kiln is made by digging some shallow hole on the earth surface, the size depends on the amount of wood material available for conversion into charcoal. The shape of the kiln also vary depending on amount of wood and preferences of the burner from dome to snake like structures. The material for conversion is chopped into sizes which vary from half metre to 2 metres. They are arranged tightly into an oval shaped mount of up to 2 metres high depending on the quantity of the material available. Most of the chopped material are wet and are usually left for some days to dry or reduce the moisture levels in the wood. The stacked wood is then covered with grass or leaves after which the soil is put back to make it air tight before firing. The attendant ensures that the stack remain air tight until the wood is converted into charcoal to avoid complete combustion. The process may take up to a week depending on the quantity, size and wetness of the wood in the stack. When there is no more burning going on in the stack the attendant does some probing using some stick to penetrate the stack and if there is no sign of smoke, the soil and other covering materials can be

removed to expose the charcoal particles. The charcoal is sorted to remove small and incomplete burned wood before loading into sacks which usually weigh up to 30 kilograms ready for transport to the market for sale or use. Most producers feel the future supply prospects of wood material is fairly stable but some felt it was decreasing.

**3.4 Marketing of Charcoal**

The buyers are local dealers who operate along the Kitui- Machakos road and local civil servants or traders. The charcoal dealers have their shades along the main Kitui to Machakos road at some irregular intervals. The Charcoal selling shades vary in number seasonally but are usually less than 10 within the study area. The sacks of charcoal are stacked on top of table like structures more than half metre heigh to avoid getting wet during rain seasons or termite damage on the packaging material. There are many different sizes of selling shades depending on the season but Kwa-Konga and Kwa-Makaani are two points which are operational throughout the year. Each shade usually has many stacks belonging to different owners. There can be up to 10 or more owners per retail point. The biggest retail point Kwa-Makaani at peak season can have up to 16 different retailers and more than 200 bags of charcoal ( See Figure 2).

Most of the retailers have been in the business for less than 15 years and many are families of local farmers, few own and operate kiosks (see Annex B). The charcoal business is a part time to main farming and domestic activities. Most of the charcoal dealers in the surveyed area are women. The suppliers of the charcoal according to the dealers are local farmers. The retailers buy direct or through their agents who deliver to their shades at a fee. Most of the customers are motorists on the Machakos - Nairobi direction and monthly sales per retailer is between 11-20 bags. The retailers were happy with the producer price but were worried of the competition posed by other retailers which depress local prices. Most viewed charcoal as a good

part time business but some problems such as lack of capital, government regulations, transport and marketing have hindered expansion of their business.

Charcoal stock levels varied over the period experiencing peak periods in June, July, August and September. These are dry season months when seasonal food stock in farm stores are lowest and agricultural activities are less. The lowest stock counts were recorded in January, February, May, June and October during the onset of the rain season and agricultural activities in the area (see Figure 2). Though not observed during the study period, more charcoal is produced during severe droughts than good rain seasons because more farmers resort to non agricultural activities to meet their daily basic needs.

Prices of charcoal varied seasonally, it showed some negative correlation to the changes in stock levels which also varied seasonally. The peak price seasons are January and lowest in August, price variation is attributed to various complex but interrelated factors. These factors include low and high charcoal production levels, rain seasons, household food stocks, transportation activities along the selling points, distant market conditions etc. The dealers report good sales the first five days of the month when many buyers earn their monthly salaries/wages in the rural and urban areas. Transporters use their empty delivery vehicles on their way to Nairobi to carry charcoal for sale to the urban whole salers and retailers.

Overally the dealers feel that their business is good because of various reasons such as, demand of charcoal by buyers is good and supply of charcoal from the producers is assured at good prices. The business needs very low capital and offers an alternative income to farming for rural women.

### 3.5 Retailer Organization

The survey revealed that there were several shades along the Machakos-Kitui road and each consisted of several charcoal dealers. There are two issues which many retailers cooperate in order to improve security of their wares and maintain good customer relation. The big shades with large charcoal wares hire a security guard at night to ensure that their charcoal are not stolen. The watchman also doubles as a seller to customers traveling during the night. Each individual keeps informal records of her stocks retiring to their homes and same exercise is done in the morning to ensure that there was no loss at night. Dealers who operate from a given shade allow the customer move round selecting the sack of charcoal of his/her preference within the shades. Once the customer chooses the charcoal, prices are negotiated with the owner and purchase deal can be struck while other dealers watch. There is a general informal cooperation among the dealers who operate their businesses in a given shade since all of them come from neighbourhood homes. Most of the charcoal dealers are women but children and men may seldomly assist them.

### 3.6 Problems

The charcoal dealers indicated that there is general lack of capital to build decent charcoal warehouse and a kiosk for stocking other merchandise to reduce reliance on charcoal business. It is the intention of each dealer to expand the charcoal stock in its shade to tap bulk customers entroute to Nairobi but lack of capital has limited their stocking capacity. Some would have liked to sell their wares in more lucrative markets such as Nairobi and Mombasa but due to lack of capital and expensive transport they cannot.

## 4.0 DISCUSSION

The income opportunities for ASAL households are limited to on-farm activities such as livestock keeping and marginal cropping but many farmers involve themselves in more than one activity as part of income diversification.

These activities include charcoal , handicrafts, beer making, hiring out labour, firewood sales etc. Surveys by Iida etal (1989) found that during mild drought climatic conditions, residents in Kwavonza location harvest only 20% of all grains required for their needs and the rest had to be purchased or received as relief/assistance from friends or relatives. The households under such conditions usually refer to seasonally induced gap filling strategies such as charcoal production to access some income. Households members engage in charcoal production and fuelwood collection in order to get cash to directly purchase food or saving for other income generating enterprises and needs.

Charcoal business is a marginal enterprise for many producers and dealers, the survey results indicate that despite 200% increase in maize meal, petrol, fresh produce(vegetables), livestock, beans, etc. after 1992 economic liberalization programme its price has hardly changed for the last three years. Between 1992 and 1994 inflation rose from 22 to 50% but charcoal prices in Kwavonza has hardly responced to the change.

Prices of charcoal in major markets such as Nairobi some 180 kilometers away range between 230 to 250 in June 1996 but the transport cost varied between 5000 to 6000 shillings per lorry trip. A seven tonne lorry can carry between 120 and 125 bags of charcoal which on delivery can fetch between 27,600 and 31,250 shillings. When the transport cost is taken into account the profit margins are high for spot sales in Nairobi of a lorry equivalent pay load.

The dealers would have liked to transport their charcoal to Nairobi, Machakos or Kitui but there are several factors which hinder such move to include high transport charges. Others are regulation of charcoal movement, regular check point and harassment, county council levy, bribes, cost of delayed delivery (overnight and meals, transport etc.), risk element, difficulties in carrying out other domestic duty while away etc. Other handicaps include raising the stock for long distance due scarcity of funds,

unreliable transport and lack of cooperative arrangements between the dealers and other factors. The dealers have therefore chosen the low risk approach of selling their charcoal at their local shades despite the low prices being offered.

## 5.0 POLICY OPTIONS

Charcoal is a very important source of energy for many Kenyans in the urban areas. Charcoal is produced every where in the country and is on sell in all corners both in urban and rural areas. There are thousands of people who rely on charcoal for employment in all stages of production, distribution and marketing. Many households, butcheries, hotels and blacksmiths rely on charcoal energy to cook and other activities but there are few legally recognized producers of charcoal in the country. Most small scale produces don't have required papers for permission to produce charcoal, they operate illegally to produce a legal and widely used product. Every rural producer and dealer knows that their business is illegal in one way or another and operate with eyes open in case somebody somewhere takes action. Under thre Chief's Act Cap 128 subsection (g) number 2 prohibits burning or movement of charcoal in any location in the country without the written authority of the provincial administration or forest officer. Chances of them being arrested or harassed and made to pay bribes or county council levy are real in the rural areas but not common. The whole issue is made more interesting by the fact that the activity is often subject to County Council levies.

Many charcoal stockists in urban areas have been in business for many years and operate with a lot of confidence and security of their business quaranteed as compared to rural counterparts.

There is urgent need for a positive policy statement on charcoal production, distribution and marketing in order to guide the sector and enable it to operate within the laws of the country and enhance security and

confidence to the operators. It will facilitate improvement of incomes to the producers and retailers who currently operate under fear and are subject to illegal fees.

The policy will provide long term solution to the current tree resource depletion through charcoal burning. It will enable technical officers interact with charcoal producers and chart out modalities of operations to enhance charcoal business and forest resource conservation. The current impasse or silence on the issues will not stop charcoal production nor guarantee conservation of natural resource in the farmlands. Charcoal producers will be educated on such issues as tree selection procedures, natural regeneration, tree planting improved technologies for producing their charcoal and marketing. The farmers will take over the protection of trees and regulation of charcoal production and technical officers will provide advisory services. The charcoal cooperatives should be promoted to market and monitor charcoal production. Members should be obliged to manage their trees and admission of members should be based on the criteria of practical sound tree management. This doesn't mean wanton destruction of vegetation for charcoal production will be encouraged but recognizes the fact that charcoal production will remain an important activity for sometime into the future. The viable extension strategy is to cooperate with the producers in regulation of the business to the advantage of conservation.

Another option is to provide alternative off-farm opportunities for farmers who have been pushed to charcoal production by desperate need to improve their basic needs and material well being. There are various options to be looked in the ASAL areas, however, the most promising is creation of local employment opportunities to absorb marginal farming families through creation labour intensive industries. This may stabilize production and reduce reliance on charcoal production as an important alternative income

and will in the long term reduce the levels of production and finally cease to be an important activity.

Curtailing of demand through creation of alternative energy sources to the current low income consumers of charcoal is promising option. The Development Plan 1989-93 proposed kerosene subsidy to encourage consumers who depend on charcoal to use the product. Although the prices of other petroleum fuels have more than doubled over the last two years, kerosene have increased at a lower pace. In 1996/97 Kenya Government Budget kerosene prices were increased therefore reversing gains of the previous budget, beside the budget there are other factors such as price of kerosene stoves which have to be simultaneously addressed. There is no alternative source of energy to replace charcoal in the poor urban dwellers kitchens in the short term and other methods need to be devised to regulate production and use of charcoal.

Vigorous promotion efficient improved jikos among the charcoal users will reduce charcoal consumption, however, its adoption rate among the low income brackets have being hindered by price, durability, and ease in lighting as compared to traditional metal jiko. The use of energy efficient jikos has grown among the middle income homes because it is used seldomly as a complimentary to other cooking facilities such as gas and electric.

Future direction in charcoal production and marketing depends on the recognition that it an essential socio-economic activity to many poor dryland households. The farmers in these areas are aware that it is destructive to the environment but limited options are available for their survival when crops fail and livestock are lost through frequent droughts.

More studies need to be done to evaluate the relationship between droughts, poverty and charcoal production, identifcation of the producers and appropriate policies and legislation needed to address the human dimension on equal terms to the envionmental concerns.

and appropriate policies and legislation needed to address the human dimension on equal terms to the envionmental concerns.

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Figure 2: Total Charcoal stocks and Prices, Kwavonza

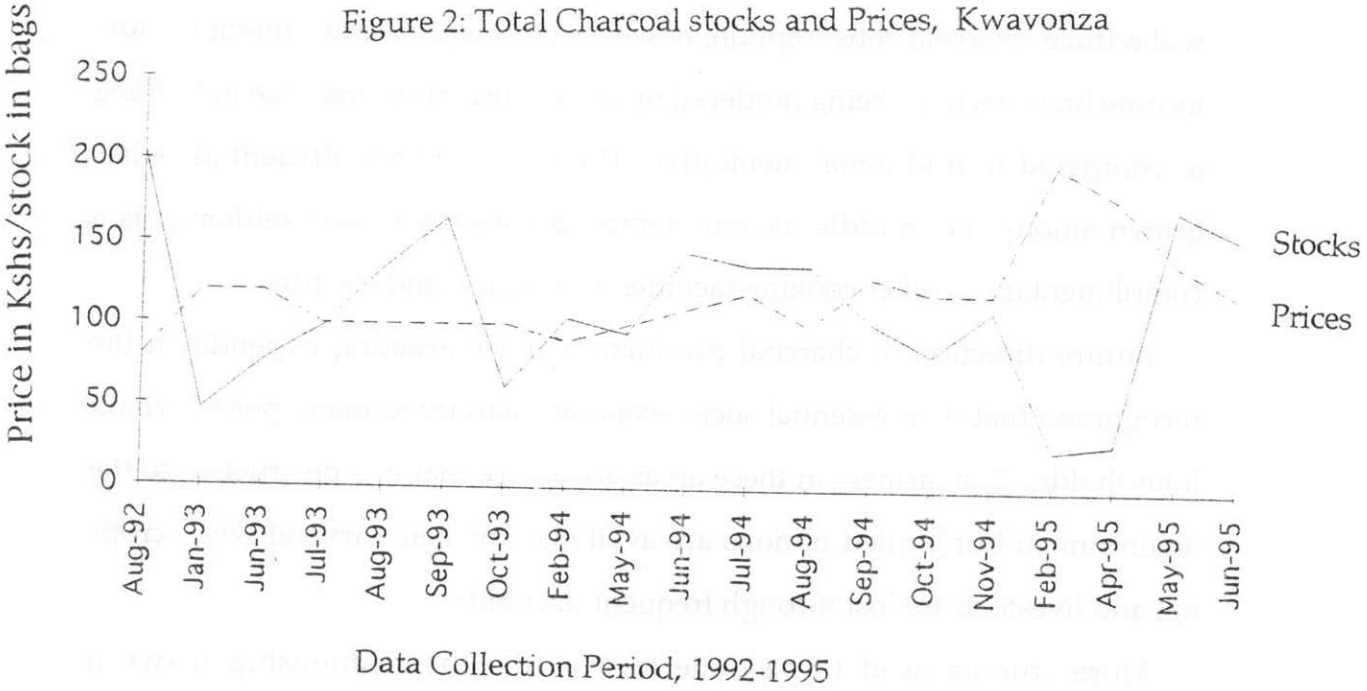
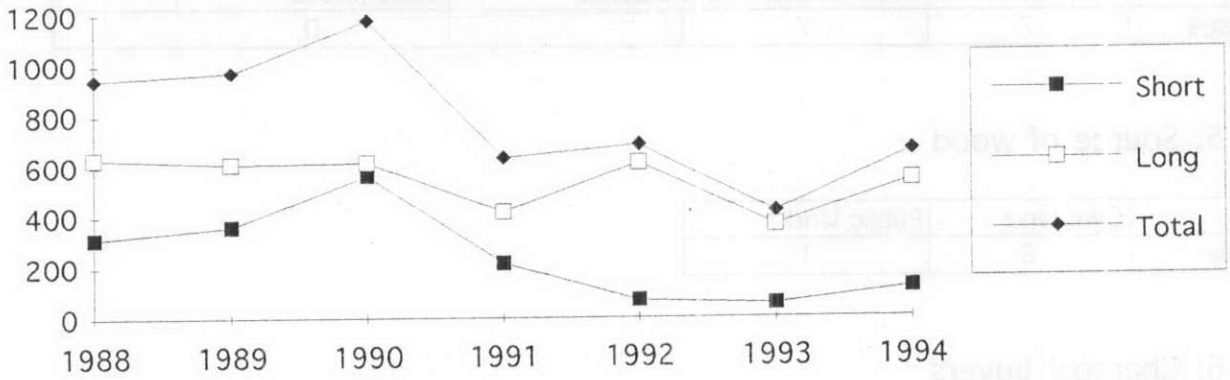


Figure 2: Rainfall at Tiva station ( mm)



## ANNEX A: CHARCOAL PRODUCER SURVEY

### Table 1: Years in charcoal production buiness (Unit years)

| Period | <1 year | 1_4 | 5_8 | 9_15 | >15 |
|---|---|---|---|---|---|
| Response | 0 | 0 | 2 | 3 | 2 |

### Table 2: Other businesses (unit: persosn)

| Activity | Farmer | Kiosk | Shop | Hawking | Non |
|---|---|---|---|---|---|
| Responses | 7 | 0 | 0 | 0 | 0 |

### Table 3: Seasonal production

| Season | Wet | Dry |
|---|---|---|
| Response | 2 | 5 |

### Table 4: Reasons for dry season production

| Reasons | Less work | Lack of alternative income | Good prices | |
|---|---|---|---|---|
| Responses | 7 | 7 | 0 | |

### Table 5: Source of wood

| Source | Own land | Public land |
|---|---|---|
| Response | 6 | 1 |

### Table 6: Charcoal buyers

| Buyers | Local dealers | Local consumers |
|---|---|---|
| Response | 7 | 7 |

### Table 7: Future supply of wood materials

| Supply | Good | Fair | Low |
|---|---|---|---|
| Response | 1 | 4 | 2 |

Table 6: Monthly sales (unit: bags)

| Numbers | <10 | 11_20 | 21_40 | >41 |
|---|---|---|---|---|
| Responses | 1 | 4 | 1 | 0 |

Table 7: Future prospects of charcoal business

| Prospects | Good | Fair | Poor |
|---|---|---|---|
| Responses | 4 | 2 | 0 |

Table 8: Reasons for good business prospects

| Reasons | Good demand | Good supply |
|---|---|---|
| Responses | 4 | 2 |

Table 9: Problems facing charcoal business

| Reasons | Capital | Government regula | Transport costs | Marketing | |
|---|---|---|---|---|---|
| Responses | 4 | 2 | 3 | 3 | |

Table 8: How to improve future wood supply

| Action | Plant trees | Regulate cutting | Dont know |
|---|---|---|---|
| Responses | 2 | 3 | 2 |

Table 9: Annual production in bags

| Number | 1_5 | 6_10 | 11_15 | 16_20 | >21 |
|---|---|---|---|---|---|
| Responses | 0 | 4 | 1 | 0 | 2 |

## ANNEX B: CHARCOAL DEALERS

Table 1: Time in charcoal business

| Years | <4 | 4_10 | 11_15 | >15 |
|---|---|---|---|---|
| Responses | 2 | 2 | 2 | 0 |

Table 2: Other businness

| Business | Farmer | Hawking | Kiosk | Shop | Non |
|---|---|---|---|---|---|
| Responsses | 3 | 3 | 0 | 0 | 0 |

Table 3: Source of charcoal on sale

| Source | Own produced | Local farmers | Others |
|---|---|---|---|
| Responses | 0 | 6 | 0 |

Table 4: Prospects of future charcoal supply

| Prospects | Good | Fair | Low |
|---|---|---|---|
| Response | 4 | 2 | 0 |

Table 5: The producer/supply prices

| Prices | High | Good | Fair |
|---|---|---|---|
| Responses | 0 | 4 | 2 |